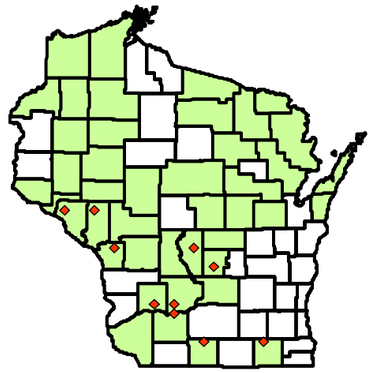
Annosum Root Rot

Introduction: Annosum root rot, caused by the fungus**,** ***Heterobasidion annosum*** was first identified in **Wisconsin in 1993** and is considered among the most important and destructive diseases affecting conifers in the north temperate regions of the world. Over 200 woody species have been reported as hosts**. Red, white and jack pine and white spruce** are the species most likely to be infected; particularly in plantation-grown stands subjected to thinning.

Known Locations: Annosum root rot has been observed in ten counties including Adams, Buffalo, Green, Iowa, LaCrosse, Marquette, Richland, Sauk, Trempealeau and Walworth. Infection has been observed on red, white and jack pine.



Counties surveyed

Locations of Annosum root rot, 2002

Symptoms & Signs:

Crown symptoms typically appear 2-3 years after a thinning. Infected trees will have thin crowns, reduced height, diameter, and shoot growth. "Infection centers" develop as the disease progresses and may contain one to many dead trees surrounded by recently dead or dying trees.

Fading and dead trees may have fruit bodies (spore-producing structures) in the root collar area. These are often so low on the tree they are buried among soil and fallen needles. Young fruit bodies appear in mid summer and look like popcorn. By fall, they are bracket-shaped - reddish brown on the top and white on the lower surface. Fruit bodies are perennial yet undergo partial deterioration each year.

Popcorn stage of *Heterobasidion annosum* fruit body, typically seen in summer.

Several *H. annosum* fruit bodies in the fall.

Underside of *H. annosum* fruit body.

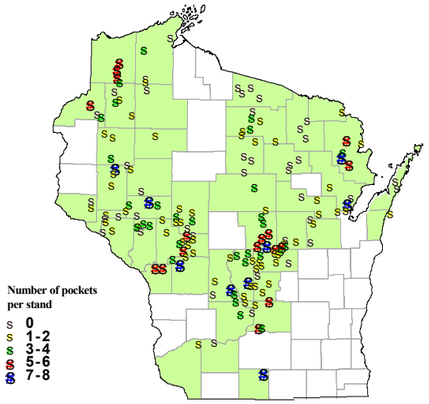
Red Pine Pocket Mortality

Introduction: Red pine pocket mortality, caused by **a complex of insects and the fungi *Leptographium terrebrantis and L. procerum*** was first identified in **Wisconsin in 1975.** National distribution of this syndrome is unknown. **Thinned, plantation-grown red pines between the ages of 30-45** are most likely to show symptoms of this syndrome.

Known Locations: Red pine pocket mortality was observed in **109** of 157 **red pine plantations** in a 2002 survey. The number of pockets per plantation varied between 0-8. Red pine is the only species that has shown symptoms of this syndrome.

Counties surveyed

Locations of stands surveyed, 2002



Symptoms & Signs:

Pockets typically start small with one to a few dead trees surrounded by trees that have reduced shoot growth and thin crowns. Each year, a few trees on the pocket edge die and the edge of the pocket expands. Over time, pockets can become quite large; 4-acre pockets have been observed.

Pitch tubes, which are signs of attack by the red turpentine beetle, *Dendroctonus valens,* are typically present on the lower bole of trees in the pocket margin. The wood in the vicinity of the pitch tubes and in the root collar area may be stained blue-black. Emergence holes of the pine engraver, *Ips pini*, are often evident on the dead trees within the pockets.

Pitch tubes caused by feeding of the red turpentine beetle, *Dendroctonus valens*

Blue-black discoloration caused by *Leptographium* spp.

Emergence holes caused by the pine engraver beetle, *Ips pini.*